2015 DMR analysis summary and tables 28 August 2015

Summary

- 1. Calculation of halibut discard mortality rates (DMRs) in the 2012, 2013 and 2014 Alaska groundfish fisheries was performed from observer data collected in the respective years. The 2014 data set was provided by the North Pacific Observer Program in early August 2015; the 2012 and 2013 data sets were obtained previously.
- 2. The data preparation and processing used the same procedures as used by IPHC staff in previous analyses, e.g., Williams (2013).
- 3. Summary tables of the results are appended to this memo. A full report will be provided for IPHC's RARA in November.

Results

- 1. The DMRs calculated in this analysis are generally in line with what's been seen in earlier years, especially for major fisheries, such as BSA trawl pollock, yellowfin and rock sole, BSA H&L cod; and GOA trawl cod, rex and flathead soles, and rockfish, and H&L cod. (Tables 2-3)
- 2. The number of hauls in which halibut viability was sampled appears to be declining. This is very troubling, because most fisheries (and vessels) have many hauls available for sampling.
- 3. In addition, it appeared that fewer halibut were sampled when sampling occurred. I noticed many instances of only one halibut sampled per haul, which is inadequate for DMR analysis and difficult to justify as a representative sample. For example, in the 2014 data set, 41.5% of trawl/pot samples had just one halibut in the haul's viability sample, and 70% had 3 or less. For 2014 H&L samples, 24% had only one halibut sampled, and 79% had 5 or less. I've noticed this a bit in past analyses but not to the extent seen in this year's work.
- 4. I believe the above data paucity contributed to the abnormally high DMRs calculated for the 2013-2014 BSA and GOA pot cod fisheries, and is likely a factor in other targets.
- 5. I filled in the table originally constructed in the NMFS analysis (Armstrong et al. 2015) with the 2012-2014 results. My results agree fairly closely with what they came up with. In a couple of cases, our results are identical but in others, they differ by 5-10%. But generally I found my results to be very similar. (Table 5)

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Table 5. AKFIN's replication of the annual DMR calculation process, for select target fisheries, compared to IPHC calculations (*with additions*)

Table 1. Groundfish target definitions and target determination criteria for observer sampled hauls.

	BSA		GOA
Target	Definition	Target	Definition
A	Atka mackerel	A	Atka mackerel
В	Bottom pollock	В	Bottom pollock
C	Pacific cod	С	Pacific cod
F	Other flatfish	D	Deep water flatfish
K	Rockfish	Н	Shallow water flatfish
L	Flathead sole	K	Rockfish
O	Other spp.	L	Flathead sole
P	Midwater pollock	O	Other spp.
R	Rock sole	P	Midwater pollock
S	Sablefish	S	Sablefish
T	Greenland turbot	W	Arrowtooth flounder
\mathbf{W}	Arrowtooth flounder	X	Rex sole
Y	Yellowfin sole		

CDQ and Non-CDQ TARGET FISHERY DETERMINATION

Bering Sea/Aleutians

- **P** if pollock \geq 95% of total catch, or
- W if arrowtooth flounder $\geq 65\%$ of total catch.
- Y/R/L/F if (rock sole + other flatfish + yellowfin sole + flathead) is the largest component of the retained catch using this rule:
 - Y if yellowfin sole is $\geq 70\%$ of (rock sole + other flatfish + yellowfin sole + flathead sole), or
 - **R** if rock sole > other flatfish and rock sole > flathead sole, or
 - L if flathead sole > other flatfish and flathead sole > rock sole, or
 - **F** if none of the three conditions above are met.

Note: If target is not P, W, Y, R, L or F, then target is whichever species or species group (A, B, C, K, O, S, or T) forms the largest part of the total catch.

Gulf of Alaska

- **P** if pollock \geq 95% of total catch, or
- W if arrowtooth flounder $\geq 65\%$ of total catch.

Note: If target is not P or W, then target is whichever species or species group (A, B, C, D, H, K, L, O, S, or X) forms the largest part of the total catch.

Table 2. Summary of halibut discard mortality rates (DMRs), expressed as percentages, in the non-CDQ Bering Sea/Aleutian (BSA) groundfish fisheries during 1990-2014.

Coom/Toward	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	601	602	602	604	'05	606	'07	'08	'09	'10	611	'12	612	614
Gear/Target	-90	-91	192	93	94	95	90	-91	'90	-99	100	'01	'02	'03	'04	05	'06	107	Uð	109	10	'11	12	'13	'14
BSA Trawl																									
Atka mackerel	66	77	71	69	73	73	83	85	77	81	77	73	85	67	63	67	64	89	90	90	87	67	90	90	86
Bottom pollock	68	74	78	78	80	73	79	72	80	74	67	74	78	65	73	79	74	69	79	88	78	85	87	86	86
Pacific cod	68	64	69	67	64	71	70	67	66	69	69	69	69	67	70	81	77	78	61	76	63	65	63	45	54
Other Flatfish	80	75	76	69	61	68	67	71	78	63	76	81	77	79	80	65	82	-	41	-	-	-	-	-	-
Rockfish	65	67	69	69	75	68	72	71	56	81	89	85	73	84	68	79	90	87	73	83	67	87	90	83	90
Flathead sole	-	-	-	-	67	62	66	57	70	79	74	69	60	69	70	83	75	80	79	75	82	55	20	81	87
Midwtr pollock	85	82	85	85	80	79	83	87	86	87	88	89	90	89	88	90	90	90	85	84	87	86	90	85	90
Rock sole	64	79	78	76	76	73	74	77	79	81	75	77	83	82	85	84	83	83	86	88	88	84	87	89	87
Sablefish	46	66	-	26	20	-	-	-	-	90	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbot	69	55	-	-	58	75	70	75	86	70	74	68	75	67	31	82	-	-	-	-	-	-	-	-	-
Arrowtooth fldr	-	-	-	-	-	-	-	-	-	-	-	-	-	67	67	90	-	-	78	-	-	-	-	-	-
Yellowfin sole	83	88	83	80	81	77	76	80	82	78	77	74	77	81	86	85	87	77	87	87	85	79	82	84	83
BSA Pot																									
Pacific cod	12	4	12	4	10	10	7	4	13	9	13	6	5	6	7	3	8	15	4	11	12	13	8	72	50
BSA Longline																									
Pacific cod	19	23	21	17	15	14	12	11	11	12	12	12	10	8	10	8	10	9	8	8	9	9	9	9	8
Rockfish	17	55	-	6	23	-	20	4	52	-	12	10	4	-	-	-	-	-	-	-	-	-	-	-	-
Sablefish	14	32	14	13	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbot	15	30	11	10	14	9	15	22	18	17	14	6	23	7	4	6	8	-	17	35	6	9	4	11	4

Table 3. Summary of halibut discard mortality rates (DMRs), expressed as percentages, in the Gulf of Alaska (GOA) groundfish fisheries during 1990-2014.

Coon/Toward	600	601	602	(02	'94	605	607	607	600	600	600	601	602	602	604	.o.=	606	'07	100	'09	(10	(11	(12	(12	(1.4
Gear/Target	'90	'91	'92	'93	-94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	109	'10	'11	'12	'13	'14
GOA Trawl																									
Atka mackerel	67	89	81	67	53	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bottom pollock	51	62	66	57	48	66	79	66	55	55	52	58	55	47	73	45	70	69	70	57	54	57	58	66	36
Pacific cod	60	62	66	59	53	64	70	62	64	54	57	67	59	69	63	66	56	61	63	62	70	52	56	66	68
Deep wtr flats	61	58	70	59	60	56	71	61	51	51	62	49	48	31	49	-	-	-	-	-	-	-	-	-	-
Shall wtr flats	66	71	69	65	62	70	71	71	67	81	67	62	66	80	71	77	70	71	66	64	56	52	72	77	58
Rockfish	65	75	79	75	58	71	65	63	68	74	71	61	64	65	73	66	48	77	75	67	66	63	56	70	64
Flathead sole	-	-	-	-	54	64	67	74	39	51	69	68	74	49	62	57	63	83	78	45	73	69	47	87	70
Midwtr pollock	71	82	72	63	61	51	81	70	80	86	80	89	90	34	88	62	66	87	-	-	-	-	20	-	-
Sablefish	70	60	68	59	67	58	80	61	-	68	38	66	62	-	79	-	89	52	-	-	-	-	-	-	35
Arrowtooth fldr	-	-	-	-	-	-	66	48	62	73	75	86	76	70	65	66	76	64	73	69	90	81	-	-	87
Rex sole	-	-	-	-	56	76	63	47	58	70	71	62	57	69	67	61	45	57	85	84	80	82	-	-	73
GOA Pot																									
Pacific cod	12	7	16	24	17	21	7	11	16	13	8	33	19	21	22	13	15	17	10	31	13	10	13	56	34
GOA Longline																									
Pacific cod	15	18	13	7	11	13	11	22	11	17	16	11	11	13	16	8	13	7	10	10	9	8	13	13	10
Rockfish	6	-	-	7	-	4	13	-	9	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sablefish	17	27	28	30	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4. Summary of halibut discard mortality rates (DMRs), expressed as percentages, in the Community Development Quota (CDQ) Bering Sea/Aleutian (BSA) groundfish fisheries during 1998-2014.

C ITT	400	400	(00	(0.4	(0.0	(0.0	40.4	 ■	10.5	.	(00	(00	(40			(10	
Gear/Target	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14
CDQ Trawl																	
Atka mackerel	-	82	89	80	90	86	87	89	80	79	90	-	-	90	58	-	90
Bottom pollock	90	88	90	90	66	-	84	90	88	83	90	74	90	82	85	87	90
Pac cod	-	-	-	-	-	-	-	-	-	-	90	90	-	90	81	80	90
Rockfish	-	88	-	90	-	-	-	-	69	82	89	-	-	-	34	-	-
Flathead sole	-	-	83	90	-	-	-	-	-	79	-	-	-	-	68	90	-
Midwtr pollock	90	90	88	89	89	90	90	90	90	90	89	90	89	90	90	90	90
Rock sole	-	-	-	-	-	-	-	-	86	89	86	-	90	89	87	88	73
Turbot	-	-	-	-	-	-	-	-	-	-	88	90	-	-	-	-	-
Yellowfin sole	-	83	-	-	81	89	88	88	73	87	89	-	-	90	-	80	86
CDQ Pot																	
Sablefish	-	-	38	46	25	22	18	56	40	24	22	50	50	31	-	53	-
CDQ Longline																	
Pacific cod	10	10	13	11	9	9	9	10	10	8	9	8	18	10	7	8	11
Turbot	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table excerpted from Armstrong et al. (2015) "Calculating halibut discard mortality rates for the Alaska groundfish fisheries".

Values in bold type for 2012-2014 are the results of the latest analysis by G. Williams

Table 5 AKFIN's replication of the annual DMR calculation process, for select target fisheries, compared to IPHC calculations

			Longline								
Year	Pacif	ic cod	Yellow	fin sole	Roc	k sole	Flathe	ad sole	Pacific cod		
	IPHC	AKFIN	IPHC	AKFIN	IPHC	AKFIN	IPHC	AKFIN	IPHC	AKFIN	
2000	69%	67.50%	77%	75.25%	75%	69.64%	74%	66.98%	12%	12.26%	
2001	69%	64.69%	74%	71.71%	77%	72.57%	69%	64.59%	12%	12.23%	
2002	69%	71.28%	77%	75.52%	83%	79.93%	60%	61.84%	10%	10.82%	
2003	67%	63.69%	81%	77.89%	82%	80.70%	69%	67.55%	8%	8.50%	
2004	70%	69.78%	86%	82.54%	85%	83.84%	70%	62.44%	10%	10.10%	
2005	81%	76.73%	85%	85.30%	84%	82.82%	83%	76.97%	8%	9.00%	
2006	77%	70.43%	87%	85.02%	83%	82.07%	75%	68.71%	10%	10.42%	
2007	78%	71.17%	77%	86.83%	83%	82.95%	80%	80.71%	9%	8.85%	
2008	61%	61.19%	87%	86.92%	86%	88.06%	79%	71.24%	8%	8.35%	
2009	76%	71.68%	87%	88.12%	88%	87.71%	75%	71.53%	8%	8.05%	
2010	63%	66.50%	85%	82.61%	88%	87.98%	82%	85.78%	9%	9.81%	
2011	65%	65.41%	79%	83.52%	84%	78.80%	55%	52.67%	9%	9.13%	
2012	63.2%	69.62%	82.3%	79.59%	87.1%	87.57%	20.0%	20.00%	9.0%	9.02%	
2013	45.4%	44.16%	84.4%	84.31%	88.5%	86.61%	81.4%	84.34%	8.6%	8.68%	
2014	54.1%	55.58%	82.8%	84.17%	87.0%	87.39%	86.5%	88.75%	7.9%	8.29%	

Note: Although not titled as such, the table contains data only from BSAI targets.